

WHAT IS CLAIMED IS:

1 1. An apparatus for a communications network, the apparatus comprising:
2 at least one interface circuit that reads frame data received from the
3 communications network and writes frame data to be transmitted over
4 the communications network, the frame data including a plurality of
5 transport overhead fields; and
6 signature logic coupled to the at least one interface circuit, wherein the
7 signature logic identifies signature data and writes the signature data
8 into at least one of a plurality of transport overhead fields in an
9 outgoing frame.

1 2. The apparatus of claim 1 further comprising:
2 reflector logic coupled to the at least one interface circuit, wherein the reflector
3 logic copies data from at least one of the received transport overhead
4 fields, the copied data being placed into a transport overhead field in
5 the outgoing frame, the copied data including the received signature
6 data.

1 3. The apparatus of claim 1 wherein the identifying signature data
2 includes data identifying the interface as one of a multiplex section protection (MSP)
3 working circuit, a MSP protect circuit, and a non-MSP circuit.

1 4. The apparatus of claim 1 wherein the identifying signature data
2 includes data identifying the interface as one of an automatic protection switching
3 (APS) working circuit, an APS protect circuit, and a non-APS circuit.

1 5. The apparatus of claim 2 wherein the at least one interface circuit
2 compares the copied data to earlier received frame data from the communications
3 network to determine whether the copied data matches signature data identified in the
4 earlier received frame data, the determination of a mismatch identifying a transition
5 by a multiplexer.

1 6. The apparatus of claim 5 wherein the router transition is between a
2 plurality of routers at a remote location.

1 7. The apparatus of claim 5 wherein the router transition is one of an APS
2 switch and an MSP switch.

1 8. The apparatus of claim 2 wherein the at least one interface circuit
2 compares the copied data to later received frame data from the communications
3 network to determine whether to update at least one routing table.

1 9. The apparatus of claim 2 further comprising:
2 another plurality of interface circuits disposed in at least one router, the router
3 coupled via the communications network to the at least one interface
4 circuit wherein the router reads the copied data including the signature
5 data identifying one of the another plurality of interface circuits as an
6 active interface, and wherein the router uses the copied data to
7 configure a communications relationship.

1 10. The apparatus of claim 9 wherein the at least one of the another
2 plurality of interface circuits is associated with a protect interface, the protect interface
3 being an active interface when transmission of data is disrupted to a working interface
4 among the another plurality of interface circuits.

1 11. The apparatus of claim 9 wherein the at least one of the another
2 plurality of interface circuits includes a protect interface router and a working
3 interface, the protect interface functioning as a backup interface, the working interface
4 functioning as a primary interface, wherein at least one router housing the protect
5 interface and the working interface uses the copied data to determine configuration
6 compatibility between the protect interface and the working interface and to determine
7 configuration compatibility among a plurality of tributary interfaces.

1 12. The apparatus of claim 9 wherein the router uses the copied data to
2 determine configuration compatibility among the another plurality of interface circuits
3 and the at least one interface circuit.

1 13. The apparatus of claim 1 wherein the transport overhead field is a path
2 level overhead field.

1 14. The apparatus of claim 13 wherein the path level overhead field is a
2 byte of a multi-byte path trace message conveyed by a path trace byte.

1 15. The apparatus of claim 14 wherein the path trace byte is represented by
2 a Synchronous Optical NETwork (SONET) path trace byte of a SONET OC-3c frame,
3 according to a STS-3c standard for SONET, the path trace byte being designated by
4 J1.

1 16. The apparatus of claim 1 wherein the communications network
2 includes a plurality of add-drop multiplexers, the plurality of add-drop multiplexers
3 receiving and transmitting the copied data in one of a plurality of transport overhead
4 fields while maintaining the copied data.

1 17. The apparatus of claim 1 wherein the communications network is a
2 fiber optic network.

1 18. The apparatus of claim 1 wherein the communications network is one
2 of a Synchronous Digital Hierarchy (SDH) and a Synchronous Optical NETwork
3 (SONET).

1 19. The apparatus of claim 1 wherein the signature logic is a program
2 product and wherein the program product comprises signal bearing media bearing
3 means for identifying the signature data and writing the signature data into at least one
4 of the plurality of transport overhead fields in an outgoing frame.

1 20. The apparatus of claim 19 wherein the signal bearing media further
2 comprises recordable media.

1 21. The apparatus of claim 19 wherein the signal bearing media further
2 comprises transmission media.

1 22. The apparatus of claim 1 wherein the reflector logic is a program
2 product and wherein the program product comprises signal bearing media bearing
3 means for copying data from received transport overhead fields and means for placing
4 the copied data into a transport overhead field in an outgoing frame.

1 23. The apparatus of claim 22 wherein the signal bearing media further
2 comprises recordable media.

1 24. The apparatus of claim 22 wherein the signal bearing media further
2 comprises transmission media.

1 25. A method for a communications network including at least one local
2 router and at least one remote router, the method comprising:
3 transmitting data in a transport overhead field to at least one remote router, the
4 data identifying an active interface in the local router;
5 receiving the data at the local router reflected from the remote router; and
6 configuring a communications relationship using the data.

1 26. The method of claim 25 further comprising:
2 avoiding alteration of the data by one or more add-drop multiplexers.

1 27. The method of claim 25 further comprising:
2 in the remote router, using the data to determine which among a plurality of
3 local interface circuits is the active interface in the local router.

36. A system for a communications network, the system comprising:
means for transmitting data in a transport overhead field to at least one remote
router, the data identifying an active interface in the local router;
means for receiving the data at the local router reflected from the remote
router; and
means for configuring a communications relationship using the data.

42. The system of claim 40, wherein the signal bearing media further comprises transmission media.

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